PATENT SPECIFICATION (11) 1 605 040

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(19) THE PATENT OFFICE LONDON

(54) IMPROVEMENTS IN OR RELATING TO TRANSDUCERS

(71) We, THE PLESSEY COMPANY LIMITED, a British Company, of Vicarage Lane, Ilford, Essex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention relates to transducers, and more particularly to transducers for telephone subscriber's instruments, incorporating piezoelectric plastics elements.

Transducers incorporating piezoelectric plastics elements have been described in our British Patent No. 1,515,287 and it is an object of the present invention to provide an alternative form of piezoelectric transducer to those previously described.

According to the present invention there is provided a piezoelectric transducer for a telephone subscriber's instrument including a multi-layered diaphragm comprising first and second piezoelectric plastics layers, a layer of non-piezoelectric material, said layer of non-piezoelectric material being sandwiched between said first and second piezoelectric plastics layer, in which said first and second piezoelectric layers are provided with at least an electrode on their outer faces, and including support means for said multi-layered diaphragm to hold said diaphragm in an untensioned state, said diaphragm being substantially flat.

Preferably said layer of non-piezoelectric material may be of a plastics material. Alternatively said layer may be a layer of fine powder.

Preferably the piezoelectric plastics layers are provided with electrodes on both surfaces. The electrodes are preferably vapour deposited on the surfaces.

Embodiments of the present invention will now be described, by way of example with reference to the drawing accompanying the provisional specification which shows a piezoelectric transducer according to the present invention.

The piezoelectric transducer shown comprises a multi-layered diaphragm constructed from first piezoelectric plastics layer 1 with electrodes 2, 3 provided on both major surfaces thereof. A second piezoelectric plastics layer 4 is similarly provided with electrodes 5, 6 on both of its major surfaces. A layer 7 is sandwiched between electrodes 3 and 5 of piezoelectric layers 1 and 4 respectively. In a preferred embodiment the layer 7 is an inert plastics layer and is preferably between one fifth and twice the thickness of one of the piezoelectric layers. The piezoelectric layers will normally be of the same thickness and an average value for their thickness will be 25 µm. The electrodes are extremely thin and will not contribute substantially to the total thickness.

The separating layer 7 will normally be between 5 and 75 µm thick.

In a second embodiment the separating layer is formed by introducing a fine powder with a carefully chosen granule size between the two electroded piezoelectric plastics layers.

The support means (not shown) for the multi-layered diaphragm structure described above may be as shown and described in the above patent.

WHAT WE CLAIM IS:-

1. A piezoelectric transducer for a telephone subscriber's instrument including a multi-layered diaphragm comprising first and second piezoelectric plastics layers, a layer of non-piezoelectric material, said layer of non-piezoelectric material being sandwiched between said first and second piezoelectric plastics layer, in which said first and second piezoelectric layers are provided with at least an electrode on their outer faces, and including support means for said multi-layered diaphragm to hold said diaphragm in an untensioned state, said

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diaphragm being substantially flat.

2. A piezoelectric transducer as claimed in claim 1 in which said layer of non-piezoelectric material is of a plastics material.

3. A piezoelectric transducer as claimed in claim 1 in which said layer of non-piezoelectric material is a layer of fine powder.

4. A piezoelectric transducer for a telephone subscriber's instrument substantially as described with reference to the drawing accompanying the provisional specification.

C. GOODMAN,
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For the Applicant.

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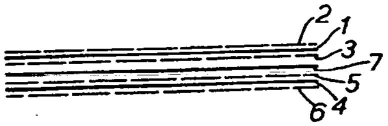
1605040 PROVISIONAL SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*



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